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Psychoactive Substance Use among People Living With HIV/AIDS (PLHIV) Accessing Care at Nigerian Institute of Medical Research, Lagos, South-Western Nigeria

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ABSTRACT

***Background*:** Psychoactive substances are gaining use worldwide among people associated with HIV/AIDS. Sharing of unsterilized needles by people who inject drugs (PWID) account for an increase in new Human Immunodeficiency Virus (HIV) infections around the world. This study aimed to ascertain the frequency and types of psychoactive substance(s) used and antiretroviral medication adherence among PLHIV in the HIV outpatient clinic at Nigerian Institute of Medical Research, Lagos, South-western Nigeria.

Methods: A total of 125 (61.9%) female and 77 (39.1%) male respondents were assessed using, Alcohol, Smoking and Substance Involvement Test (ASSIST) and level of adherence to antiretroviral drugs. To screen participants for psychoactive substance use. A 10-Panel-Generic-Multi-Drug-Urine-Dip-Card Test Kit was used.

***Results**:* About 85% of respondents showed adherence to ART while 15% did not. Level of adherence to drug use associated significantly (P≤0.05) with age and occupation. Alcohol (100%) was indicated as the most widely consumed psychoactive substances by the respondents in their life-time. The commonest drug detected by toxicology in the respondents was Marijuana (3%) followed by benzodiazepine (1%), methamphetamine (0.5%), amphetamine (0.5%) and opiates (0.5%). Significant differences (P≤0.05) were observed in cannabis, cocaine, amphetamine, inhalant, hallucinogen, opioids, and other unidentified drugs with the level of adherence.

Conclusion: The study shows high level of adherence to ART and that some psychoactive substances significantly interfered with the adherence to ART. It could be said that consumption of psychoactive substances by PLHA could reduce the level adherence to ART which does not look good in the fight against HIV/AIDS.

Keywords: Alcohol, Smoking and Substance Involvement Test (ASSIST), Antiretroviral medication, HIV/AIDS, People Living with HIV/AIDS (PLHIV), Psychoactive substances

1. INTRODUCTION

The Human Immunodeficiency Virus (HIV) has exerted a profound and enduring impact upon the lives of infected individuals across the globe over the past four decades. Nigeria's HIV burden stands among the most severe globally, positioning the country second worldwide in terms of epidemic magnitude, with an estimated 1.9 million individuals presently living with the virus. Contemporary epidemiological evidence indicates an incidence rate of 8.0 per 10,000 persons across all genders and age cohorts, alongside a prevailing adult prevalence of 1.4% within the 15–49-year age bracket [1]. According to the most recent UNAIDS Global AIDS Update, an estimated 40.8 million [37.0–45.6

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million] people were living with HIV at the end of 2024, of whom 31.6 million were receiving antiretroviral therapy [2,3]. An estimated 1.9 million people are living with HIV in Nigeria and by 2023, ART coverage had grown to over 1.78 million people (90 per cent of people living with HIV) [4,5]. Nigeria is, therefore, among the highest burdened countries for HIV. There are some known channels through which HIV can be transmitted, such as unprotected sex with multiple partners, men having sex with men, sharing unsterilized sharp materials (such as needles and razor blades), and mother-to-child transmission (during pregnancy, labour and delivery, and through breastfeeding [6]. Needle sharing among people who use drugs (PWID) continues to be a major driver of new HIV infections globally. A recent multi-source estimation found that key populations, including PWID, sex workers, and men who have sex with men, accounted for over half of all new adult HIV infections globally [7]. A landmark systematic review estimated 14.8 million PWID worldwide, with evidence of injecting drug use now documented in 190 of 207 countries [8]. In sub-Saharan Africa, women who engage in sex work face an HIV incidence approximately eight times higher than the matched general female population, and the co-occurrence of drug use among this group further amplifies transmission risk and serves as a bridge to the wider epidemic [9]. Psychoactive substances (PSU) are drugs or chemicals which, when administered by oral or other routes, induce alterations in the mental processes of individuals [10]. These substances are employed both therapeutically and recreationally. Examples include alcohol, caffeine, nicotine, marijuana, cocaine, heroin, and opioids. A recent systematic review and meta-analysis of substance use among young people in sub-Saharan Africa reported a lifetime prevalence of 21 per cent, with alcohol being the most used substance [11]. A further systematic review focusing on West Africa documented a pooled alcohol use prevalence of 44 per cent [12]. The consumption of alcohol has been implicated in the aetiology of over 200 illnesses, including hepatic cirrhosis, various malignancies, and cardiovascular disease, as well as injuries arising from violence and road traffic collisions [13]. A hospital-based study among people living with HIV on ART in Ethiopia reported an overall AUD prevalence of 38.8 per cent, with hazardous use, harmful use, and alcohol dependence accounting for 24.6, 6.1, and 8.1 per cent respectively [14]. Consistent with this, a 2024 multicentred cross-sectional study of HIV-positive patients in northwest Ethiopia found a high prevalence of hazardous alcohol consumption, with stigma and low social support identified as key associated factors [15]. The UNODC World Drug Report 2025 estimated that 316 million individuals used psychoactive substances globally in 2023, representing a 28 percent increase over the preceding decade, with cannabis accounting for the largest share at 244 million users [16]. A recent systematic review across 19 countries found marijuana prevalence of 12 per cent in countries where the drug is legalised, and 5.4 per cent in countries where it is not [17]. In Nigeria, a recent meta-analysis of 72 studies found a lifetime cannabis prevalence among adults to be 8.28 per cent: higher in northern than in western regions (9.93% vs 5.59%) [18]. A study on the prevalence of substance abuse among some patients at the University of Lagos Medical Centre, Nigeria showed that Cannabis (59.5%) was the most abused, while the least was cocaine (6.42%) [19]. A community survey in south-eastern Nigeria also reported an emerging methamphetamine ('Mkpurummiri') prevalence of 21.8 per cent [20]. The use of illicit psychoactive substances is reported in people living with HIV (PLHIV). A cross-sectional survey of 11 low- and middle-income countries documented unhealthy alcohol, and drug use in 21 per cent, and 5 per cent, respectively, of PLHIV aged 40 years or above on ART [21]. In Tanzania, a study of PLHIV found the prevalence of an alcohol use disorder was 28.2 per cent [22]. These statistics are cause for concern regarding the potential impact of unhealthy use of psychoactive substances on adherence to ART and eventually on control and treatment of HIV/AIDS. Psychoactive substance use by PLHIV may affect their adherence to ART, lead to riskier sexual behaviours, result in treatment failure, and cause other health problems [23]. Given that PLHIV need to adhere to prolonged ART to suppress viral growth and delay the progress of HIV disease, it is essential for them to avoid psychoactive substances that may alter their cognitive function and in doing so hinder their ability to adhere to medications. Therefore, this study aimed to determine the frequency and pattern of psychoactive substance use and evaluate antiretroviral medication adherence among people living with HIV/AIDS attending the HIV outpatient clinic of the Nigerian Institute of Medical Research, Lagos, Nigeria.

2 MATERIALS AND METHODS

2.1 Materials

2.1.1 Biological Materials

Freshly voided human urine samples

2.1.2 Chemicals and Reagents

Drug test reagents

The Identify Diagnostics 12 Panel Drug Test Dip containing; amphetamines (Amp), Barbiturates (BAR), Benzodiazepines (BZO), Buprenorphine (BUP), Cocaine (COC), Ecstasy (MDMA), Marijuana (THC), Methadone (MTD), Methamphetamines (MET), Opiates/Morphine (MOP), Oxycodone (OXY), Phencyclidine (PCP) was used.

2.1.3 Equipment and Other Materials

Identify Diagnostics 12 Panel Drug Test Dip, Sterile urine containers, ASSIST questionnaire tools and the Data collection forms were used

2.2 Methods

2.2.1 Study Design

Purposive sampling technique was used in this study. Patients of the clinic who had history of alcohol or psychoactive substance use were enrolled in the study.

2.2.2 Study Site

The study was a cross-sectional study carried out in the Clinical Sciences Department, HIV Out-patient Clinic of the Nigerian Institute of Medical Research (NIMR), Lagos, Nigeria. The Centre is a trusted source of basic, applied, and operational research for the improvement of the country's national health and development. This Institute was one of 25 centres chosen in 2002 to execute the Federal Government of Nigeria antiretroviral therapy (ART) initiative. So far, this site has enrolled more than 23,000 HIV positive adults and children including pregnant women. At enrolment, any history of psychoactive substance use by a patient was documented and this information is stored in the programme's electronic database.

2.2.3 Study Population

The study population consisted of enrolled HIV positive persons aged 18 and older who stated at registration that they had a history of psychoactive substance usage. These patients were enrolled in the study during their routine drug refill and/ or doctor's appointment visit to the clinic.

2.2.4 Sample Size Determination

The RAOSOFT online sample size calculator was used to calculate the sample size for the study. http://www.raosoft.com/samplesize.html. Given that this site's HIV treatment programme serves roughly 23,000 individuals, and assuming a 50 % error distribution with a 6.9 % margin of error at the 95 percent confidence interval, the needed minimum sample size of patients was 202. One Hundred and one (101) persons who did not report history of psychoactive substance use at enrolment served as the control group.

2.2.5 Sampling Technique

Adherence to Antiretroviral Drugs (ARV) was used. Adherence was defined as the patient's capacity to take his/her ARV drugs according to the doctor's prescription. It was determined by self-reporting of the most recent missed medication within the past 30 days (one month). It was computed as the ratio of tablets consumed to those prescribed. For example, a patient taking one medication per day may have missed two tablets in the previous 30 days, resulting in a 28/30 = 93 % adherence rate. Participants with a 95 percent or higher self-report score will be classified as an adherent based on this concept. A standardized questionnaire completed by an interviewer was used to collect data on the number of tablets missed in the previous 30 days to calculate adherence.

The formula for self-report adherence is provided below.

$$\% \text{ adherence} = \frac{Number\ of\ tablets\ taken\ per\ day (as\ reported\ by\ client)}{Prescribed\ number\ of\ tablets\ per\ day\ (label)} \text{ x } 100$$

2.2.6 Inclusion and Exclusion Criteria

This study included HIV positive adults, older than 18 years of age, who have been on antiretroviral therapy (ART) for more than one year. Patients with no documented history of PSUs, pregnant women, and children were excluded from the course of this study.

2.2.7 Data Collection

The enrolled participants were interviewed using a semi-structured questionnaire containing closed-ended and opened-ended questions to gather information on demographics, socioeconomic characteristics, antiretroviral (ARV) drug medication, and drug adherence pattern.

2.2.8 Alcohol, Smoking and Substance Involvement Test (ASSIST) Assessment

The ASSIST (https://assistportal.com.au) was developed by a multinational group of addiction specialists and physicians under the auspices of the World Health Organisation (WHO), in response to the substantial public health burden associated with psychoactive drug use worldwide [23]. It is an eight-item questionnaire designed to screen for the use of the following substances: cigarettes, alcohol, cannabis, cocaine, amphetamine-type stimulants, sedatives (benzodiazepines), hallucinogens, inhalants, and opioids. The questionnaire was administered to each participant by a trained interviewer.

2.2.9 Toxicological Analysis

Approximately 15ml of freshly voided urine was collected in sterile sample bottles on a day of a clinic or drug refill scheduled appointment. These samples were collected on site and thereafter, they were tested for common substances of abuse using the Identify Diagnostics 12 Panel Drug Test Dip which instantly tested for 12 different drugs namely; amphetamines (Amp), Barbiturates (BAR), Benzodiazepines (BZO), Buprenorphine (BUP), Cocaine (COC), Ecstasy (MDMA), Marijuana (THC), Methadone (MTD), Methamphetamines (MET), Opiates/Morphine (MOP), Oxycodone (OXY), Phencyclidine (PCP).

2.3. Statistical Analysis

All numerical data collected were statistically analysed using Statistically Package for the Social Sciences (SPSS) for Windows, version 26.0 software. Frequency counts and percentages were generated for all variables, and a statistical test of significance for association was performed. Significance was fixed at $P \leq 0.05$ and highly significant at $P \leq 0.01$. Chi-square test was used to determine associations between categorical variables. Statistical analyses were performed using SPSS version 26.0. Statistical significance was set at $p < 0.05$.

3. RESULTS

3.1 Socio-demographic characteristics of respondents

The socio-demographic characteristics of respondents participating in the study are represented in Table 1. There were a total of two-hundred and two (202) respondent, 125 females (61.9%) and 77 (39.1%) males. Most of the respondents were aged 41-50 (34.7%, n = 70), while the least were aged 61-70 years (35%, n = 7). Most of the respondents were married (55%, n= 111), while the remaining 45% reported either being single, separated from their spouses or widowed. Many of the respondents (53%, n = 107) have finished from secondary institution, while a further 37.5% (n = 76) have completed tertiary education (University, colleges, or polytechnics). 99.5% of the participants have completed at least primary formal education. An overwhelming number of participants have a monthly income below 50,000 Nigerian Naira (n = 137, 67.8%). Employment status of the respondents shows that 31.7% (n = 64) are unemployed and only 12.9% respondents reported to be civil servants. Most respondents were traders (n = 112, 55.4%). Majority of the respondents were of the Igbo tribes (50.5%, n = 112), and 200 of the respondents were Nigerians (99%).

Table 1: Socio-demographic characteristics of respondents

Variable	Frequency (n=202)	Percentage (%)
	Age (years)	
<=20	27	13.4
21-30	34	16.8
31-40	32	15.8
41-50	70	34.7
51-60	32	15.8
61-70	7	3.5

	Sex	
Male	77	38.1
Female	125	61.9
	Marital Status	
Single	81	40.1
Married	111	55.0
Separated	5	2.5
Widowed	5	2.5
	Ethnicity	
Igbo	102	50.5
Yoruba	83	41.1
Hausa	15	7.4
Non-Nigeria	2	1.0
	Level of education	
No formal education	1	0.5
Primary	18	8.9
Secondary	107	53.0
Tertiary	76	37.6
	Monthly income	
<50,000	137	67.8
50,000-100,000	32	15.8
101,000-200,000	17	8.4
>200,000	16	7.9
	Occupation	
Unemployed	64	31.7
Civil servant	26	12.9
Trader	112	55.4
	Nationality	
Nigerian	200	99.0
Non-Nigerian	2	1.0

3.2 Adherence to Antiretroviral (ARV) Drugs

Adherence signifies the consistent use of the prescribed drugs by the patients. Among the respondents, 85% adhered to antiretroviral therapy while 15% do not make use of the drug as shown in Figure 1.

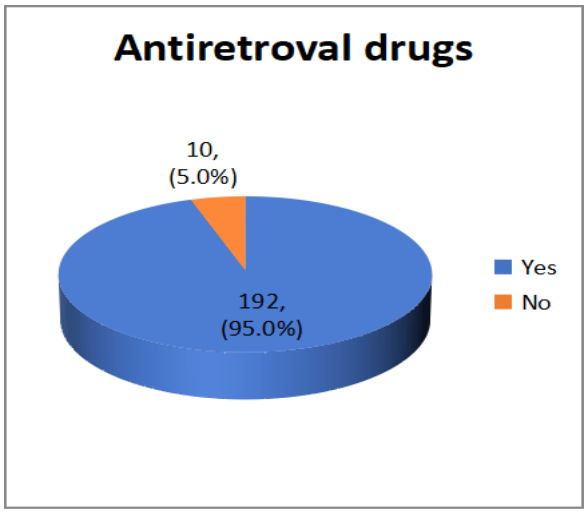

Figure 1: Adherence status to ARV drugs among participants.

3.3 Determination of Distribution of Psychoactive Substance use once in their lifetime **using the ASSIST Questionnaire**

The respondents have consumed various psychoactive substances such as tobacco, alcohol, cannabis, cocaine, amphetamine, inhalant, sedative, hallucinogens, opioids, and other unidentified drugs as listed in Table 2 once in their lifetime. Table 2 shows the rate of the use of substances by the respondents once in their lifetime. Among the respondents, Tobacco had the lowest number of consumers (48.51%). The most common substance used was alcohol with a 100% use rate. All correspondents reported the use of alcohol at least once in their lifetime.

Table 2: Distribution of Psychoactive Substance use once in their lifetime among the participants using the ASSIST Questionnaire

Substance	Frequency (n=202)	Percentage (%)
Tobacco	98	48.51
Alcohol	202	100.0
Cannabis	101	50.00
Cocaine	101	50.00
Amphetamine	101	50.00
Inhalant	101	50.00
Sedative	200	99.00
Hallucinogen	201	99.50
Opioids	201	99.50
Others Drugs	201	99.50

Also, the participants were tested for the use of drugs. Results show that all participants reported negative for the use of Phencyclidine, Cocaine, Oxycodone, Ecstasy, Barbiturates, and Buprenorphine. The commonest drug detected among respondents was Marijuana (3%, n = 6). Other drugs were identified in some participants, and they are represented in Table 3.

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Table 3: Toxicology report using Identity 12 panel drug test strips.

Drugs	Frequency	Percentage (%)
	Methamphetamines	
Negative	201	99.5
Positive	1	0.5
	Phencyclidine	
Negative	202	100.0
	Cocaine	
Negative	202	100.0
	Oxycodone	
Negative	202	100.0
	Amphetamines	
Negative	201	99.5
Positive	1	0.5
	Methadone	
Negative	202	100.0
	Benzodiazepines	
Negative	200	99.0
Positive	2	1.0
	Barbiturates	
Negative	202	100.0
	Marijuana	
Negative	196	97.0
Positive	6	3.0
	Opiates / Morphine	
Negative	201	99.5
Positive	1	0.5
	Ecstasy	
Negative	202	100.0
	Buprenorphine	
Negative	202	100.0

3.4 Association between socio-demographic variables and level of adherence

Table 4 shows determinants of level of adherence. Factors significantly associated with level of adherence to drug use were age (P≤0.05) and occupation (P≤0.05). Results showed that among the 77 males, 79.2% adhered to the use of drugs, while 20.8% did not adhere. Among the female population, there were more females that adhered than those that did not adhere. In the study, "age group" showed acceptable statistically significant difference (P≤0.05) compared to the level of adherence. All participants aged 61–70 reported adherence to drug use (n = 7; 100%) and this was the highest frequency across the age groups. The occupation of participants in relation to their level of adherence showed an acceptable statistically significant deviation with a p-value less than 0.05. In the occupation sub-group, Civil servants reported the highest level of adherence with 92.3% (n=26) participants while unemployed individuals reported the lowest level of adherence with 70.3% individuals (n=64).

Table 4: Determinants of level of adherence using socio-demographic variables

Socio-demographic variable	Level of adherence		X^2	P-value
	Adhered	Not adhered		
	Sex			
Male	61(79.2)	16(20.8)	0.018	0.894

Female	100(80.0)	25(20.0)		
	Age (years)			
<=20	18(66.7)	9(33.3)	13.493	0.019
21-30	24(70.6)	10(29.4)		
31-40	22(68.8)	10(31.3)		
41-50	61(87.1)	9(12.9)		
51-60	29(90.6)	3(9.4)		
61-70	7(100.0)	0(0.0)		
	Marital Status			
Single	58(71.6)	23(28.4)	6.260	0.100
Married	94(84.7)	17(15.3)		
Separated	5(100.0)	0(0.0)		
Widowed	4(80.0)	1(20.0)		
	Ethnic Group			
Igbo	85(83.3)	17(16.7)	5.883	0.117
Yoruba	60(72.3)	23(27.7)		
Hausa	14(93.3)	1(6.7)		
Non-Nigeria	2(100.0)	0(0.0)		
	Level of Education			
No formal education	1(100.0)	0(0.0)	1.867	0.600
Primary	15(83.3)	3(16.7)		
Secondary	88(82.2)	19(17.8)		
Tertiary	57(75.0)	19(25.0)		
	Monthly Income			
<50,000	110(80.3)	27(19.7)	0.405	0.939
50,000-100,000	26(81.3)	6(18.8)		
101,000-200,000	13(76.5)	4(23.5)		
>200,000	12(75.0)	4(25.0)		
	Occupation			
Unemployed	45(70.3)	19(29.7)	6.454	0.040
Civil servant	24(92.3)	2(7.7)		
Trader	92(82.1)	20(17.9)		
	Nationality			

Nigerian	159(79.5)	41(20.5)	0.514	0.473
Non-Nigerian	2(100.0)	0(0.0)		

3.5 Association between psychoactive substances and adherence

Significant differences were observed in cannabis (P≤0.05), cocaine (P≤0.05), amphetamine (P≤0.05), inhalant (P≤0.05), hallucinogen (P≤0.05), opioids (P≤0.05) and other unidentified drugs (P≤0.05) with the level of adherence respectively.

Table 5: Association between psychoactive substances and adherence to ART

Substance	Level of adherence		X^2	P-value
	Adhered	Not adhered		
Tobacco				
Yes	157(79.3)	41(20.7)	1.039	0.308
No	4(100.0)	0(0.0)		
Alcohol				
Yes	161(79.7)	41(20.3)		
Cannabis				
Yes	161(80.1)	40(19.9)	3.946	0.047
No	0(0.0)	1(100.0)		
Cocaine				
Yes	161(80.1)	40(19.9)	3.946	0.047
No	0(0.0)	1(100.0)		
Amphetamine				
Yes	161(80.1)	40(19.9)	3.946	0.047
No	0(0.0)	1(100.0)		
Inhalant				
Yes	161(80.1)	40(19.9)	3.946	0.047
No	0(0.0)	1(100.0)		
Sedative				
Yes	160(80.0)	40(20.0)	1.102	0.294
No	1(50.0)	1(50.0)		
Hallucinogen				
Yes	161(80.1)	40(19.9)	3.946	0.047
No	0(0.0)	1(100.0)		
Opioids				

Yes	161(80.1)	40(19.9)	3.946	0.047
No	0(0.0)	1(100.0)		
Other Drugs				
Yes	161(80.1)	40(19.9)	3.946	0.047
No	0(0.0)	1(100.0)		

3.6 Association between Drugs Usage and levels of Adherence to ART

Chi-square test was also used to analyse deviations between the levels of adherence (*i.e.,* adhered, and non-adhered) for individuals who tested positive to the usage of selected drugs in the study. Some drugs were not detected in the participants of the study. Thus, the result showed no chi-square value nor P-values. There was a significant deviation in the level of adherence among individuals tested for Methamphetamine *(P≤0.05)* as shown on table 6.

Table 6: Association between Drugs Usage and levels of Adherence to ART

Drugs	Level of adherence		X^2	P-value
	Adhered	Not adhered		
Methamphetamines				
Negative	161(80.1)	40(19.9)	3.946	0.047
Positive	0(0.0)	1(100.0)		
Phencyclidine				
Negative	161(79.7)	41(20.3)		
Cocaine				
Negative	161(79.7)	41(20.3)		
Oxycodone				
Negative	161(79.7)	41(20.3)		
Amphetamines				
Negative	160(79.6)	41(20.4)	0.256	0.613
Positive	1(100.0)	0(0.0)		
Methadone				
Negative	161(79.7)	41(20.3)		
Benzodiazepines				
Negative	159(79.5)	41(20.5)	0.514	0.473
Positive	2(100.0)	0(0.0)		
Barbiturates				
Negative	161(79.7)	41(20.3)		

Marijuana				
Negative	157(80.1)	39(19.9)	0.650	0.420
Positive	4(66.7)	2(33.3)		
Opiates / Morphine				
Negative	160(79.6)	41(20.4)	0.256	0.613
Positive	1(100.0)	0(0.0)		
Ecstasy				
Negative	161(79.7)	41(20.3)		
Buprenorphine				
Negative	161(79.7)	41(20.3)		

4. DISCUSSION

The prevalence of substance abuse among some in- and/or out-patients at using urine samples and Questionnaires was determined and depression was the major cause of substance abuse. The prevalence of psychoactive substance use in the surveyed population overall was low. This contrasts with the much higher prevalence reported in studies among university students and young adults in Nigeria. A study of medical students at Niger Delta University, a recent school study in south-eastern Nigeria and University of Lagos Medical Centre, Lagos Nigeria found the abuse of psychoactive substances and association with depression [19, 25, 26]. Cross-sectional survey data from internally displaced people in the north-eastern city of Maiduguri also confirmed that psychoactive substance use is common among vulnerable populations living in conflict prone areas in the country [27]. The main reasons for substance use were availability, unemployment, to get "high", and peer pressure. The most widely used psychoactive substance in this study was alcohol, reported by all the respondents (100%). Whilst the sample size is relatively small, this finding is broadly consistent with the wider literature. A systematic review and meta-analysis of alcohol use disorders in sub-Saharan Africa reported an adult lifetime alcohol use prevalence of 34.9% [13], and a study among PLHIV in Tanzania found an alcohol use disorder prevalence of 28.2% [22]. Furthermore, a scoping review of substance use brief interventions across Africa underscored the predominance of alcohol-focussed research, noting a paucity of evidence concerning other substances [28]. A high proportion of individuals in this study adhered to their antiretroviral drugs. However, despite advances in HIV treatment over more than four decades of the epidemic, a significant minority remain non-adherent. This finding has important clinical implications: non-adherence is associated with elevated viral load, reduction in TCD4+ lymphocyte counts, increased HIV transmission, heightened morbidity and mortality, the development of drug-resistant viral strains, and diminished quality of life. A recent systematic review of ART adherence in sub-Saharan Africa found rates ranging from 43 to 84%, with western Africa exhibiting the lowest adherence (43–60%) [29]. A further systematic review and meta-analysis documented a pooled prevalence of viral non-suppression of 20% among PLHIV on ART in sub-Saharan Africa, with substance use identified as a key contributing factor [30]. In the present study, approximately 85% of respondents demonstrated adherence, a figure that compares favourably with regional averages. Non-adherence to ART may arise from a constellation of factors, including unemployment, poverty, low educational attainment, ignorance, overwork, forgetfulness, and the consumption of alcohol and psychoactive substances. A study in north-western Ethiopia found that alcohol use disorder was significantly associated with poorer ART adherence, with a prevalence of 38.8% among PLHIV [14]. A further study among PLHIV on ART in north-western Tanzania reported that alcohol use was associated with ART non-adherence, with an odds ratio of 2.78 [31]. A pilot trial in Malawi demonstrated that an economic and relationship-strengthening intervention targeting heavy drinking improved ART adherence from 63.2 to 73.9% [32]. Koyejo and Gbiri reported the lifetime use of psychoactive substances e.g. alcohol (84.8%) among the people living with HIV/AIDS in a Tertiary Health Care Centre in Southwest Nigeria [33]. In another study, of the total participants, 64 (21.7%) reported use of a form of psychoactive substance, among which the largest proportion (19.3%) reported use of alcohol, 1.4% use cannabis while 1% admitted to use of nicotine. The present findings are consonant with this body of evidence, suggesting that alcohol and other substance use among PLHIV constitutes a meaningful risk factor for

non-adherence. The data further indicate that the degree of dependence on substances may have influenced adherence to ART. A distinction in the tendency towards non-adherence was observed in respondents who reported addiction to cannabis, cocaine, amphetamines, inhalants, hallucinogens, opioids, and other substances, as compared to the non-users of these compounds. A survey of people who inject drugs with HIV who have been receiving medication-assisted treatment programs in Dar es Salaem, Tanzania, affirmed that the individuals with drop-in as people who inject drugs had reduced ART adherence [35]. Also, in a large multi-site study in the United States, the use of methamphetamine was linked to a 10.1% lowering in the mean adherence of ART and both alcohol and severity of drug use were predictors of non-adherence [23]. The respondents age might also have contributed to adherence where older respondents had higher rates of adherence, perhaps because of enhanced maturity and developed healthcare-seeking behaviours. It is worth mentioning that the disruption of illicit substance use to ART adherence complicates already existing pathological conditions and leads to higher treatment expenses that are related to further procedures and hospitalisations. The importance of health professionals who work with PLHIV to establish effective follow-up support, possibly with built-in substance use screening and intervention, needs to be emphasized to achieve better treatment adherence to ART and, in parallel to psychoactive substance use.

CONCLUSION

Adherence to antiretroviral therapy is a dynamic and intricate process which should be constantly monitored over a long period of time. This paper shows that the overall rate of compliance with ART has been high in the study population, and that some groups of psychoactive agents have a big impact in disrupting treatment compliance. Adherence to the ART of the PLHIV can be reduced in case they use such substances and weaken the struggle against HIV/AIDS. A limitation of this study includes the relatively small size of its sample; additional studies with increased and more varied sample sizes should be conducted to help clarify the entire spectrum of factors that can define and influence drug adherence. This kind of evidence may enlighten the creation of specific policies striving to address the twofold issue of psychoactive substance use and HIV/AIDS. Routine psychoactive substance screening should be incorporated into HIV treatment programmes to improve adherence outcomes among PLHIV.

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Ethical Approval and Consent

The study protocol was approved by the Institutional Review Board of the Nigerian Institute of Medical Research (NIMR-IRB) (NO: IRB/22/011). All the processes involved in the study were explained to the participants prior to sample collection. Informed verbal and signed written consent and questionnaires were completed and willingly obtained from all the study participants. They also gave other basic information and their consent to publish.

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